

PESTICIDE MONITORING PROGRAM

SUMMARY

MAP

As part of the District's quarterly ambient monitoring program, unfiltered water and sediment samples from 36 sites were collected from November 13 to November 16, 2000, and analyzed for over sixty pesticides and/or products of their degradation. The herbicides ametryn, atrazine, bromacil, hexazinone, norflurazon, and simazine, along with the insecticides/degradates atrazine desethyl, atrazine desisopropyl, alpha endosulfan, ethion, and ethoprop, were detected in one or more of these surface water samples. The herbicide ametryn, together with the insecticides/degradates aldrin, DDD, DDE, DDT, and ethion, were found in the sediment at several locations, along with one PCB compound.

The District's pesticide monitoring network includes stations designated in the Everglades National Park Memorandum of Agreement, the Miccosukee Tribe Memorandum of Agreement, the Lake Okeechobee Operating Permit, and the non-Everglades Construction Project (non-ECP) permit. The District's canals and marshes depicted in Figure 1 are protected as Class III (fishable and swimmable) waters, while Lake Okeechobee is protected as a Class I drinking water supply. Water Conservation Area 1 (WCA1) and the Everglades National Park are also designated as Outstanding Florida Waters, to which anti-degradation standards apply. Surface water and sediment are sampled quarterly and semiannually, respectively, upstream at each structure identified in the permit or agreement.

Surface Water Findings

At least one pesticide was detected in surface water and sediment at 27 and 16 of the 36 and 33 sites, respectively. Sediment samples are not routinely collected at GORDYRD and CR33.5T. Field staff were not able to obtain a sediment sample at S9. The concentrations of the pesticides detected at each of the sites are summarized for the surface water and sediment in Tables 11 and 12, respectively. All these compounds have previously been detected in this monitoring program.

The ethion concentration of 0.026 .g/L at S99, exceeds the chronic toxicity level (0.003 µg/L) for *Daphnia magna* calculated according to promulgated procedure (FAC 62-302.200). *Daphnia magna* is a sensitive indicator species for aquatic macroinvertebrates. At this level, long term exposure can cause adverse effects on macroinvertebrate species, but the pulsed nature of agricultural runoff releases to the canal system precludes drawing any conclusions about the effects of long term average exposures. With the method detection limit around 0.02 µg/L, any detection will automatically exceed the calculated chronic toxicity (0.003 µg/L) for *Daphnia magna*.

Only alpha (α) endosulfan was detected in the surface water at four locations in the South Miami-Dade farming area during this sampling event. However, none of the concentrations exceeded the Florida Class III surface water quality standard (Chapter 62-302). Endosulfan was not quantified in the sediment at any of the sampling locations.

Some of the detected sediment concentrations of aldrin, DDD, DDE, and DDT, are usually associated with the potential for impacting wildlife when compared to coastal sediment quality assessment guidelines. One of the DDT and two of the DDD detections were of a magnitude considered to represent significant and immediate hazard to aquatic organisms in coastal sediments. However, there are no corresponding freshwater sediment quality assessment guidelines to further evaluate potential hazards at the District's sampling sites.

The above findings must be considered with the caveat that pesticide concentrations in surface water and sediment may vary significantly in relation to the timing and magnitude of pesticide application, rainfall events, pumping and other factors, and that this was only one sampling event. The possible long term or chronic toxicity impacts are also reported based on the single sampling event and do not take into account previous monitoring data.

Table 11. Summary of pesticide residues above the method detection limit found in surface water samples collected by the District in October 2000.

Date	Site	Flow	Compounds (µg/L)											Number of Compounds Detected at Site
			ametryn	atrazine	atrazine desethyl	atrazine desisopropyl	bromacil	alpha endosulfan	ethion	ethoprop	hexazinone	Norflurazon	simazine	
11/13/00	S18C	N	-	(0.011)	-	-	-	(0.0074)	-	-	-	-	-	2
	S178	N	-	(0.027)	-	-	-	(0.0028)	-	-	-	-	-	2
	S177	Y	-	(0.01)	-	-	-	(0.0043)	-	-	-	-	-	2
	S332	N	-	(0.027)	-	-	-	(0.004)	-	-	-	-	-	2
	S176	N	-	(0.01)	-	-	-	-	-	-	-	-	-	1
11/14/00	US41-25	N	-	-	-	-	-	-	-	-	-	-	-	0
	S12C	Y	-	-	-	-	-	-	-	-	-	-	-	0
	S31	N	-	-	-	-	-	-	-	-	-	-	-	0
	S9	N	-	-	-	-	-	-	-	-	-	-	-	0
	S331	Y	-	-	-	-	-	-	-	-	-	-	-	0
	G211	Y	-	-	-	-	-	-	-	-	-	-	-	0
	S99	N	-	-	-	(0.012)	(0.061)	-	(0.026)	-	-	0.74	0.062	5
	GORDYRD	N	-	-	-	(0.015)	(0.069)	-	-	-	-	0.74	0.11	4
	S80	N	-	-	-	-	(0.085)	-	-	-	-	0.48	0.1	3
	S2	N	(0.018)	0.11	(0.023)	-	-	-	-	-	-	-	(0.014)	4
	S3	N	(0.015)	0.15	(0.034)	(0.011)	(0.056)	-	-	-	-	-	(0.025)	6
	S4	N	(0.013)	0.13	(0.032)	(0.011)	(0.049)	-	-	-	-	-	(0.025)	6
11/15/00	S140	N	-	-	-	-	-	-	-	-	(0.061)	(0.041)	(0.014)	3
	S190	N	-	-	-	-	(0.057)	-	-	-	-	0.087	-	2
	G123	N	-	-	-	-	-	-	-	-	-	-	-	0
	S142	N	-	-	-	-	-	-	-	-	-	-	-	0
	S38B	N	(0.014)	1.4	0.096	-	-	-	-	-	-	-	-	3
	S79	N	-	0.043	-	-	1.1	-	-	-	-	0.38	0.18	4
	CR33.5T	Y	-	0.092	-	-	1.5	-	-	-	-	0.49	0.11	4
	S78	N	(0.028)	0.26	(0.021)	-	-	-	-	-	(0.026)	0.31	(0.019)	6
	S235	N	(0.022)	0.1	(0.019)	-	(0.065)	-	-	-	-	(0.036)	0.068	6
	FEC SR78	N	-	-	-	-	-	-	-	-	-	-	-	0
	S65E	N	-	-	-	-	(0.079)	-	-	-	-	(0.02)	(0.036)	3
	S191	N	-	-	-	-	(0.044)	-	-	-	(0.025)	(0.028)	(0.026)	4
11/16/00	L3BRS	N	(0.011)	-	-	-	-	-	-	-	-	-	-	1
	S8	N	(0.021)	(0.027)	-	-	-	-	-	-	-	-	-	2
	S7	R	(0.01)	-	-	-	-	-	-	-	-	-	-	1
	S6	N	0.062	(0.013)	-	-	-	-	-	(0.041)	-	-	-	3
	S5A	N	0.045	0.043	-	-	-	-	-	-	-	-	0.27	3
	ACME1DS	N	0.039	-	-	-	-	-	-	-	-	-	-	1
	G94D	N	(0.035)	-	-	-	-	-	-	-	-	-	-	1
Total Number of Compound Detections			13	16	6	4	11	4	1	1	3	11	14	

Flows: N - no, Y - yes, R - Reverse; - Denotes that the result is below the MDL; bolded value represents the average of duplicate samples; value in parenthesis represents concentrations less than the minimum quantification limit and greater than or equal

Table 12. Summary of pesticide residues above the method detection limit found in sediment samples collected by the District in November 2000.

DATE	SITE	Compounds (µg/Kg)							Number of compounds Detected at Site
		aldrin	ametryn	DDD	DDE	DDT	ethion	PCB1254	
11/13/00	S177	-	-	-	8.9	-	-	-	1
11/14/00	S331	-	-	-	(3.1)	-	-	-	1
	S31	-	-	-	(3.8)	-	-	-	1
	G211	-	-	-	(4.0)	-	-	-	1
	S3	-	-	(5.1)	-	-	-	-	1
	S4	-	(20)	-	-	-	-	-	1
	S80	-	-	-	(8.4)	-	-	-	1
	S99	-	-	-	(1.4)	-	(9.2)	-	2
11/15/00	S79	-	-	-	(17)	-	-	(170)	2
	S190	-	-	-	(1.9)	-	-	(28)	2
	S142	-	-	-	(3.0)	-	-	-	1
11/16/00	ACMEIDS	(0.83)	-	(3.0)	7.9	-	-	-	3
	S5A	-	-	(34)	75	(3.2)	-	-	3
	S6	-	21	(64)	260	(8.5)	-	-	4
	L3BRS	-	-	-	(2.8)	-	-	-	1
	S8	-	(4.7)	-	4.3	-	-	-	2
Total number of compound detections		1	3	4	14	2	1	2	

- Denotes that the result is below the MDL; value in parenthesis represents concentrations less than the minimum quantification limit and greater than or equal to the minimum detection limit.